W-95

USDA FOREST SERVICE GENERAL TECHNICAL REPORT PNW-95
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TO SERIES FOR
NTIFYING FOREST RESIDUES IN THE:

SIERRA MIXED CONIFER TYPE
SIERRA TRUE FIR TYPE

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RETURN TO GOVT. DOCS. CLERK

ABSTRACT

Five series of photographs display different forest residue loading levels, by size classes, for areas of like timber type (Sierra mixed conifer and Sierra true fir) and cutting objective.

Information with each photo includes measured weights, volumes and other residue data, information about the timber stand and harvest actions, and assessment of fire behavior and suppression difficulty.

These photo series provide a fast and easy-to-use means for quantifying and describing existing and expected residues.

KEYWORDS: Residues, residue management, fuel hazard rating, fire behavior (forest), slash (Sierra mixed conifer), slash (Sierra true fir), residue measurements, residue surveys.

ACKNOWLEDGMENT OF COOPERATION

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LIST OF PLANT SPECIES CITED

California black oak . . . . . *Quercus kelloggii* Newb.
Douglas-fir . . . . . *Pseudotsuga menziesii* (Mirb.) Franco
grand fir . . . . . *Abies grandis* (Dougl.) Lindl.
incense-cedar . . . . . *Libocedrus decurrens* Torr.
Jeffrey pine . . . . . *Pinus jeffreyi* Grev. & Balf.
ponderosa pine . . . . . *Pinus ponderosa* Laws.
red fir . . . . . *Abies* spp.
sugar pine . . . . . *Pinus lambertiana* Dougl.
western white pine . . . . . *Pinus monticola* Dougl.
white fir . . . . . *Abies concolor* (Gord. & Glend.) Lindl.

METRIC CONVERSIONS

1 acre	= 0.404 7 hectare
2.471 acres	= 1 hectare
1 cubic foot	= 0.283 2 cubic meter
35.31 cubic feet	= 1 cubic meter
1 foot	= 0.304 8 meter
3.281 feet	= 1 meter
1 inch	= 2.54 centimeter
0.3937 inch	= 1 centimeter
1 ton (short)	= 0.907 ton (metric)
1.102 tons (short)	= 1 ton (metric)

WHAT ARE THESE PHOTO SERIES?

These photo series are arrays of photos; each array shows different residue loading levels generated from like timber types and cutting practices. Each photo is supplemented with information which includes:

- Measured quantities by size classes, average depth, ground area covered, and other residue data.
- Harvest information.
- Assessment of fire behavior and suppression difficulty.

Thus, the series provide a basis for quantifying and describing existing and expected residue loadings on other areas and serve as a communication link among users.

WHY ARE THEY NEEDED?

Timber harvesting, silvicultural practices, and land clearing operations annually generate forest residues on thousands of acres in the Sierra Nevada.

Although some residues are beneficial for nutrient cycling, soil protection, wildlife cover, and the microclimate, excessive residues adversely affect the forest environment in many ways. Much of the forest contains residues in undetermined quantities, which are

excessive from the standpoints of resource use, protection, and management. So that residues may be reduced to a level considered desirable, estimates are needed on quantities that now exist or will be created by some activity.

Inventory techniques, such as the planar intersect method, are useful when a high degree of accuracy is needed but are time consuming and costly to apply extensively. Photo series can be used to make fast, easy, and inexpensive quantifications of residue, adequate for most management needs.

There has been no way for all resource disciplines to become readily familiar with volumes and descriptions of residue so that they can make quantitative inputs to residue management. Likewise, because fuel rating systems are specialized and subjective, they too are not readily adapted to other environmental components. These deficiencies can be overcome with the photo series.

HOW CAN THEY BE USED?

Inventory of Down Residue

Loadings in various residue size classes, average residue depth, and ground area covered are characteristics that are visible in the photographs; hence, users can estimate any of these characteristics on an area being inventoried by comparing them with the photos as follows:

1. Observe each characteristic of the residue on the ground (e.g., 3.1- to 9-inch loading).

2. Select a photo that nearly matches, or photos that bracket, the observed characteristic.

3. Obtain the quantitative value for the characteristic being estimated from the data sheet accompanying the selected photo (or interpolate a value between photos).

These steps are repeated for each characteristic desired. If the general area being inventoried has zones of obvious differences in residue loading, the user should consider making separate determinations for each zone; these can then be weighted and cumulated for the whole area.

Residue characteristics not distinguishable in the photographs are duff and litter depth, proportion of sound residue by species, and proportion rotted. If values for these characteristics are desired in an inventory, they must be derived from independent sampling or observations.

Inventory information can be used by land managers to (1) evaluate impacts residues have on various aspects of forest management, (2) identify areas of unacceptable residue loading, (3) identify priority areas for treatment, (4) estimate amount of utilizable material, and (5) predict characteristics of fire behavior and resistance to suppression.

Determination of Desired Residue Level

Land management objectives can be more nearly achieved if a team of appropriate specialists can participate in specifying residues that should remain onsite after completion of a cutting activity. Individuals helping with these determinations can study the photo series to recognize the appearance of various quantities and distributions of residue. With this knowledge, each individual can describe in quantitative terms the residue thought necessary to meet environmental concerns and goals of a particular specialty. The team can then use the photo series as a communication tool to resolve differences in arriving at a desired level of residue.

After treatment, the degree to which objectives were achieved can be judged by comparing observed posttreatment loading with the desired level description.

Prediction of Residues From Planned Cutting and Residue Changes From Treatments

Photo series are a rudimentary aid for predicting amounts of residue from cutting and changes in residue from treatments. Many factors, such as condition of timber stand, topography, logging method, and intensity of utilization, affect the volume of resulting residues. Therefore, users should bear in mind that these series depict only a few of the possible combinations.

To predict residue volumes from planned cutting, the user compares timber volume and size information from cutting plans with this kind of information in the photo series. Selecting a photo series level or levels with similar stand characteristics, the user refers to data sheet loadings, considers factors that differ from the photo series situations, and quantifies the loading expected.

Predicted loadings can be used to support changes in cutting and removal actions and to plan appropriate treatments.

To predict residue changes from treatments, the user studies the treated and untreated levels in the photo series to gain knowledge of relative changes or reductions affected by sample treatments. Then, comparing residue inventory or preharvest prediction information with levels in the series, the user predicts the change a specific treatment may produce.

Predicted change in residue from treatments can aid in (1) identifying treatments that will reduce residues to the desired level, (2) selecting the most cost-effective treatments, and (3) estimating tons that will be consumed by fire or removed in other ways. Improved accuracy in estimating tons consumed by fire will increase the reliability of calculations of emissions from particulates and chemical compounds.

HOW WERE THEY DEVELOPED?

Area Selection and Data Collection

Areas photographed for these series were selected to show typical residue loading variations resulting from commonly applied harvest and cultural practices in selected major vegetative types of the Sierra Nevada. Photos were taken and collected as follows:

1. Areas were photographed and the material in the photo area sampled in accordance with USDA Forest Service national guidelines.[1]

2. Measurements were made in accordance with the "Handbook for Inventorying Downed Woody Material."[2] Specific gravities used for calculating loadings are based on ovendry weights and air-dry volumes.

3. Information about timber stands, logging practices, and residue treatments were obtained from timber sale records in field offices or estimated on the site if such records were not available.

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[1]U. S. Department of Agriculture, Forest Service. 1975. National fuel classification and inventory system, preliminary draft. 61 p., illus. Wash. Off., Washington, D. C.

[2]Brown, James K. 1974. Handbook for inventorying downed woody material. USDA For. Serv. Gen. Tech. Rep. INT-16, 24 p., illus. Intermt. For. and Range Exp. Stn., Ogden, Utah.

Assessment of Fire Behavior and Suppression Difficulty

Quantities of dead and down fuel in each photo example were assessed for wildfire spread rate, flame length, and resistance to suppression, based on assumed conditions of 0- to 15-percent slope, 4-percent fine fuel moisture, and 10-miles-per-hour windspeed at 20 feet; procedures used were determined from fuel model scaling tables developed by Dr. David V. Sandberg, and a resistance to suppression matrix developed by Wayne G. Maxwell.[3]

HOW CAN THEY BE SUPPLEMENTED?

If users in the Pacific Southwest find they have important local residue loadings not adequately represented, they can supplement these series or develop additional series by following procedures described in the referenced documents. The series in this publication may be usable, in total or in part, in appropriate vegetative types in other regions.

These series do not show residue loadings in stands undisturbed by cutting activities. Natural residue photo series are being developed for inventorying such areas.

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[3]Unpublished data on file at Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

HOW ARE LEVELS IN THESE SERIES CODED?

The data for each level are presented on the page facing the photo. Facing picture and data pages have the same code for the residue situation shown. The code shows:

a. Order of rank from lightest loading to heavist loading shown in the series of photographs.

b. Forest type; e.g., MC = mixed conifer, TF = true fir.

c. Forest size class, where:

1 = <5-inch d.b.h.

2 = 5- to 11-inch d.b.h.

3 = 12- to 20-inch d.b.h.

4 = >20-inch d.b.h.

d. Cutting practice, where:

RC = regeneration cut (clearcut, seed tree, shelterwood).

PC = partial cut (tree selection, group selection, overstory removal, understory removal, sanitation).

EXAMPLE: 1-MC-4-RC is the first photo in the series for mixed conifer, >20-inch diameter trees, after harvest by regeneration cutting.

This report augments published photo series for residue levels in western forest vegetative types.[4]

[4]Maxwell, Wayne G., and Franklin R. Ward. 1976. Photo series for quantifying forest residues in the: Coastal Douglas-fir--hemlock type, coastal Douglas-fir--hardwood type. USDA For. Serv. Gen. Tech. Rep. PNW-51, 103 p., illus. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

Maxwell, Wayne G., and Franklin R. Ward. 1976. Photo series for quantifying forest residues in the: Ponderosa pine type, ponderosa pine and associated species type, lodgepole pine type. USDA For. Serv. Gen. Tech. Rep. PNW-52, 73 p., illus. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

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MIXED CONIFER

SIZE CLASS 4

REGENERATION CUT

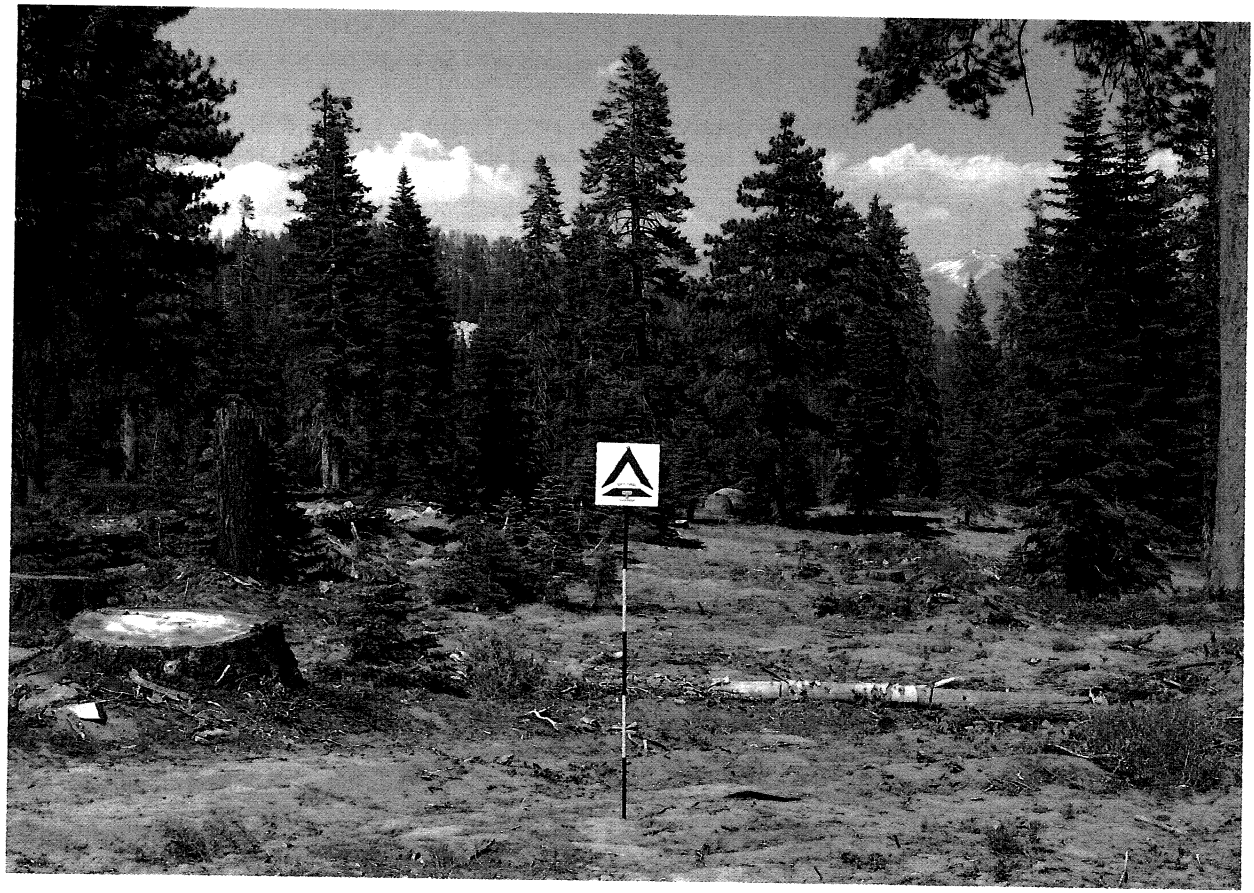
A SERIES OF 3 LEVELS

REMINDERS TO USERS:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.

2. Stumps are not included in residue quantities.

3. Rotted residue is that which would come apart or splinter when kicked.



1-MC-4-RC

DATA SHEET

Residue descriptive code 1-MC-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	2.6	174
1.1 - 3.0	4.8	385
3.1 - 9.0	4.3	360
9.1 -20.0	2.8	225
20.1+	0	0
Total	14.7	1,157

OTHER MEASUREMENTS

Average residue depth		(feet)	0.1
Ground area covered by residue 1/4-inch diameter and larger		(percent)	61
Average duff and litter depth		(inches)	.3
Sound residue 3.1-inch diameter and larger	Jeffrey pine	(percent)	64
	white fir	(percent)	27
		(percent)	
Rotted residue 3.1-inch diameter and larger		(percent)	9

HARVEST INFORMATION

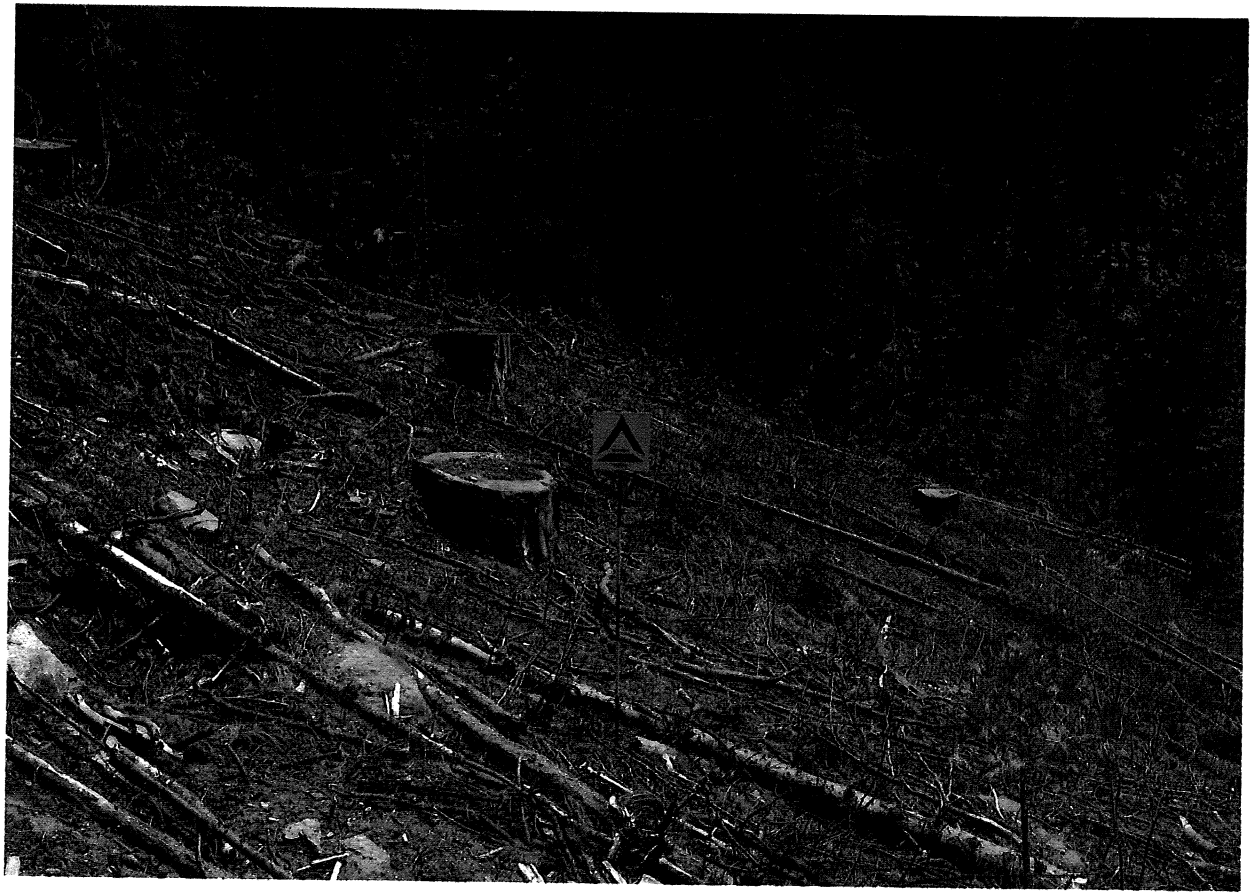
		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) 18	x	
Net volume	(M fbm/acre) 12	x	
Average stems/acre cut	10		x
Average d.b.h. of stems cut	(inches) 34		x
Stand age	(years) 300		x
Cutting prescription	Shelterwood	x	
Yarding method	Tractor	x	
Slash treatment	Tractor pile & burn	x	
Period since cut or treatment	(months) 22	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	0
Flame length	(feet)	0
Resistance to suppression	(chains/man-hour)	3.0

REMARKS

First entry in old-growth stand.



2-MC-4-RC

DATA SHEET

Residue descriptive code 2-MC-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.4	27
0.26- 1.0	5.7	381
1.1 - 3.0	11.8	945
3.1 - 9.0	8.9	726
9.1 -20.0	2.7	216
20.1+	6.9	553
Total	36.4	2,848

OTHER MEASUREMENTS

Average residue depth		(feet)	0.5
Ground area covered by residue 1/4-inch diameter and larger		(percent)	91
Average duff and litter depth		(inches)	1.4
Sound residue 3.1-inch diameter and larger	Jeffrey pine	(percent)	75
	white fir	(percent)	21
	other	(percent)	4
Rotted residue 3.1-inch diameter and larger		(percent)	0

HARVEST INFORMATION

			Sale records	Onsite estimation
Gross volume		(M fbm/acre) 22	x	
Net volume		(M fbm/acre) 20	x	
Average stems/acre cut		54	x	
Average d.b.h. of stems cut		(inches) 24	x	
Stand age		(years) 250		x
Cutting prescription	Clearcut		x	
Yarding method	High-lead		x	
Slash treatment	None		x	
Period since cut or treatment		(months) 7	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	9
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	1.1

REMARKS

First entry in old-growth stand.

3-MC-4-RC

DATA SHEET

Residue descriptive code 3-MC-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.7	47
0.26- 1.0	9.6	641
1.1 - 3.0	21.6	1,731
3.1 - 9.0	13.7	1,152
9.1 -20.0	52.4	4,340
20.1+	27.9	2,351
Total	125.9	10,262

OTHER MEASUREMENTS

Average residue depth		(feet)	0.9
Ground area covered by residue 1/4-inch diameter and larger		(percent)	87
Average duff and litter depth		(inches)	2.1
Sound residue 3.1-inch diameter and larger	white fir	(percent)	38
	sugar pine	(percent)	24
	other	(percent)	38
Rotted residue 3.1-inch diameter and larger		(percent)	0

HARVEST INFORMATION

			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	11.4	x	
Net volume	(M fbm/acre)	10.1	x	
Average stems/acre cut		12	x	
Average d.b.h. of stems cut	(inches)	23	x	
Stand age	(years)	150	x	
Cutting prescription		Clearcut	x	
Yarding method		Tractor	x	
Slash treatment		None	x	
Period since cut or treatment	(months)	6	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	12
Flame length	(feet)	8
Resistance to suppression	(chains/man-hour)	0.4

REMARKS

Old slash from partial cut prior to this clearcut entry was in evidence.

MIXED CONIFER

SIZE CLASS 4

PARTIAL CUT

A SERIES OF 8 LEVELS

REMINDER TO USERS:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.

2. Stumps are not included in residue quantities.

3. Rotted residue is that which would come apart or splinter when kicked.

1-MC-4-PC

DATA SHEET

Residue descriptive code 1-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	2.0	134
1.1 - 3.0	3.8	304
3.1 - 9.0	.5	42
9.1 -20.0	0	0
20.1+	0	0
Total	6.5	493

OTHER MEASUREMENTS

Average residue depth		(feet)	0.01
Ground area covered by residue 1/4-inch diameter and larger		(percent)	89
Average duff and litter depth		(inches)	.1
Sound residue 3.1-inch diameter and larger	white fir	(percent)	60
	incense-cedar	(percent)	40
		(percent)	
Rotted residue 3.1-inch diameter and larger		(percent)	0

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) 4.6	x	
Net volume	(M fbm/acre) 4.6	x	
Average stems/acre cut	15	x	
Average d.b.h. of stems cut	(inches) 22	x	
Stand age	(years) 150		x
Cutting prescription	Tree selection	x	
Yarding method	Tractor	x	
Slash treatment	Machine pile & burn		x
Period since cut or treatment	(months) 8		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	3
Flame length	(feet)	2
Resistance to suppression	(chains/man-hour)	6.0

REMARKS

2-MC-4-PC

DATA SHEET

Residue descriptive code 2-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	1.0	67
0.26- 1.0	4.1	274
1.1 - 3.0	8.0	641
3.1 - 9.0	9.6	751
9.1 -20.0	3.9	284
20.1+	0	0
Total	26.6	2,017

OTHER MEASUREMENTS

Average residue depth		(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger		(percent)	100
Average duff and litter depth		(inches)	1.8
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent)	43
	incense-cedar	(percent)	34
	other	(percent)	19
Rotted residue 3.1-inch diameter and larger		(percent)	4

HARVEST INFORMATION

			HARVEST INFORMATION SOURCE	
			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	5.8	x	
Net volume	(M fbm/acre)	5.3	x	
Average stems/acre cut		23	x	
Average d.b.h. of stems cut	(inches)	20	x	
Stand age	(years)	150	x	
Cutting prescription		Overstory removal	x	
Yarding method		Rubber tire skidder	x	
Slash treatment		Machine treat 1/	x	
Period since cut or treatment	(months)	8	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	3
Flame length	(feet)	3
Resistance to suppression	(chains/man-hour)	1.0

REMARKS

Treated with Hydro-ax machine.

1/

3-MC-4-PC

DATA SHEET

Residue descriptive code 3-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0	0
0.26- 1.0	.4	27
1.1 - 3.0	3.1	248
3.1 - 9.0	8.9	766
9.1 -20.0	12.2	1,140
20.1+	4.0	427
Total	28.6	2,608

OTHER MEASUREMENTS

Average residue depth		(feet)	0.2
Ground area covered by residue 1/4-inch diameter and larger		(percent)	36
Average duff and litter depth		(inches)	.6
Sound residue 3.1-inch diameter and larger	incense-cedar	(percent)	25
	sugar pine	(percent)	16
	other	(percent)	19
Rotted residue 3.1-inch diameter and larger		(percent)	40

HARVEST INFORMATION

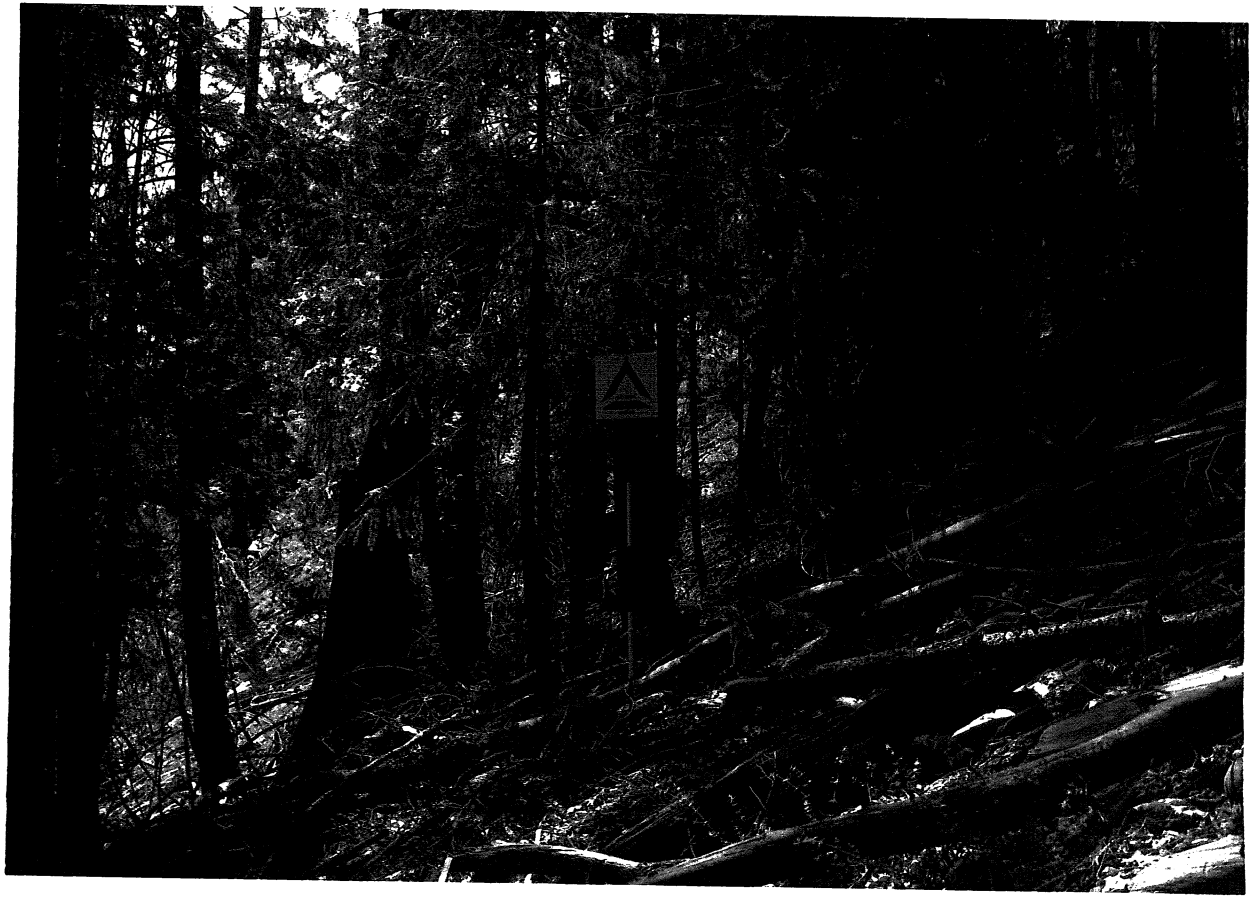
			HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre)	35	x	
Net volume	(M fbm/acre)	33.5	x	
Average stems/acre cut		32	x	
Average d.b.h. of stems cut	(inches)	22	x	
Stand age	(years)	250		x
Cutting prescription		Group selection	x	
Yarding method		Skyline	x	
Slash treatment		YUM[1/] & underburn	x	
Period since cut or treatment	(months)	<1	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	0
Flame length	(feet)	0
Resistance to suppression	(chains/man-hour)	2.4

REMARKS

First entry in old-growth stand.



4-MC-4-PC

DATA SHEET

Residue descriptive code 4-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.8	53
0.26- 1.0	4.0	267
1.1 - 3.0	6.2	497
3.1 - 9.0	14.7	1,071
9.1 -20.0	8.9	724
20.1+	3.6	296
Total	38.2	2,908

OTHER MEASUREMENTS

Average residue depth		(feet)	1.1
Ground area covered by residue 1/4-inch diameter and larger		(percent)	91
Average duff and litter depth		(inches)	1.7
Sound residue 3.1-inch diameter and larger	white fir	(percent)	38
	Douglas-fir	(percent)	18
		(percent)	36
Rotted residue 3.1-inch diameter and larger		(percent)	8

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) 24	x	
Net volume	(M fbm/acre) 22	x	
Average stems/acre cut	15	x	
Average d.b.h. of stems cut	(inches) 24	x	
Stand age	(years) 200+	x	
Cutting prescription	Overstory removal	x	
Yarding method	Tractor	x	
Slash treatment	None	x	
Period since cut or treatment	(months) 12	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	7
Flame length	(feet)	4
Resistance to suppression	(chains/man-hour)	1.2

REMARKS

Much old, untreated slash on ground from prior sales.

5-MC-4-PC

DATA SHEET

Residue descriptive code 5-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.5	33
0.26- 1.0	5.3	354
1.1 - 3.0	12.0	962
3.1 - 9.0	12.9	1,113
9.1 -20.0	10.8	915
20.1+	0	0
Total	41.5	3,377

OTHER MEASUREMENTS

Average residue depth		(feet) 0.1
Ground area covered by residue 1/4-inch diameter and larger		(percent) 69
Average duff and litter depth		(inches) .3
Sound residue 3.1-inch diameter and larger	incense-cedar	(percent) 85
	ponderosa pine	(percent) 15
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent) 0

HARVEST INFORMATION

Gross volume	(M fbm/acre)	5.8
Net volume	(M fbm/acre)	5.8
Average stems/acre cut		7
Average d.b.h. of stems cut	(inches)	26
Stand age	(years)	100
Cutting prescription		Tree selection
Yarding method		Tractor
Slash treatment		None
Period since cut or treatment	(months)	8

HARVEST INFORMATION SOURCE

	Sale records	Onsite estimation
Gross volume	x	
Net volume	x	
Average stems/acre cut	x	
Average d.b.h. of stems cut	x	
Stand age		x
Cutting prescription	x	
Yarding method	x	
Slash treatment	x	
Period since cut or treatment		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	9
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	0.9

REMARKS

6-MC-4-PC

DATA SHEET

Residue descriptive code 6-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	1.6	107
0.26- 1.0	8.7	581
1.1 - 3.0	6.1	489
3.1 - 9.0	20.5	1,772
9.1 -20.0	6.9	632
20.1+	0	0
Total	43.8	3,581

OTHER MEASUREMENTS

Average residue depth	(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger	(percent)	97
Average duff and litter depth	(inches)	.4
Sound residue 3.1-inch diameter and larger white fir	(percent)	54
incense-cedar	(percent)	24
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	22

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) 23	x	
Net volume	(M fbm/acre) 20.5	x	
Average stems/acre cut	34	x	
Average d.b.h. of stems cut	(inches) 26	x	
Stand age	(years) 100		x
Cutting prescription	Tree selection	x	
Yarding method	Tractor	x	
Slash treatment	None	x	
Period since cut or treatment	(months) 36	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	10
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	0.7

REMARKS

Some old, untreated slash on ground from cutting prior to the recent sale.

7-MC-4-PC

DATA SHEET

Residue descriptive code 7-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.6	40
0.26- 1.0	6.7	447
1.1 - 3.0	10.8	865
3.1 - 9.0	3.7	254
9.1 -20.0	8.0	693
20.1+	21.2	1,774
Total	51.0	4,073

OTHER MEASUREMENTS

Average residue depth		(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent)	67
Average duff and litter depth		(inches)	2.4
Sound residue 3.1-inch diameter and larger	incense-cedar	(percent)	52
	white fir	(percent)	45
	other	(percent)	3
Rotted residue 3.1-inch diameter and larger		(percent)	0

HARVEST INFORMATION

			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	27		x
Net volume	(M fbm/acre)	23		x
Average stems/acre cut		30		x
Average d.b.h. of stems cut	(inches)	28		x
Stand age	(years)	250		x
Cutting prescription	Tree selection			x
Yarding method	Tractor			x
Slash treatment	None			x
Period since cut or treatment	(months)	12		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	9
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	0.6

REMARKS

8-MC-4-PC

DATA SHEET

Residue descriptive code 8-MC-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	1.0	67
0.26- 1.0	5.9	394
1.1 - 3.0	7.9	633
3.1 - 9.0	22.9	1,741
9.1 -20.0	7.3	647
20.1+	16.5	1,102
Total	61.5	4,584

OTHER MEASUREMENTS

Average residue depth		(feet)	1.0
Ground area covered by residue 1/4-inch diameter and larger		(percent)	95
Average duff and litter depth		(inches)	1.0
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent)	68
	ponderosa pine	(percent)	4
	other	(percent)	1
Rotted residue 3.1-inch diameter and larger		(percent)	27

HARVEST INFORMATION

			HARVEST INFORMATION SOURCE	
			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	5.5		x
Net volume	(M fbm/acre)	4.8		x
Average stems/acre cut		24	x	
Average d.b.h. of stems cut	(inches)	17	x	
Stand age	(years)	80	x	
Cutting prescription	Tree selection		x	
Yarding method	Tractor		x	
Slash treatment	None		x	
Period since cut or treatment	(months)	12	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	9
Flame length	(feet)	5
Resistance to suppression	(chains/man-hour)	0.7

REMARKS

Some old, large residue from early cutting existed on this site prior to recent cutting.

MIXED CONIFER

SIZE CLASS 3

PARTIAL CUT

A SERIES OF 8 LEVELS

REMINDER TO USERS:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.

2. Stumps are not included in residue quantities.

3. Rotted residue is that which would come apart or splinter when kicked.

DATA SHEET

Residue descriptive code 1-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	1.9	127
1.1 - 3.0	.8	64
3.1 - 9.0	.4	35
9.1 -20.0	1.1	95
20.1+	0	0
Total	4.4	334

OTHER MEASUREMENTS

Average residue depth	(feet)	0.1
Ground area covered by residue 1/4-inch diameter and larger	(percent)	88
Average duff and litter depth	(inches)	.8
Sound residue 3.1-inch diameter and larger incense-cedar	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION

		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 3.9		x
Net volume	(M fbm/acre) 3.8		x
Average stems/acre cut	30		x
Average d.b.h. of stems cut	(inches) 15		x
Stand age	(years) 80		x
Cutting prescription	Tree selection		x
Yarding method	Tractor		x
Slash treatment	Hand piled & burned		x
Period since cut or treatment	(months) 30		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	4
Flame length	(feet)	2
Resistance to suppression	(chains/man-hour)	6.0

REMARKS

General marking rule on this sale was to cut all stems over 10-inch d.b.h.

2-MC-3-PC

DATA SHEET

Residue descriptive code 2-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	2.8	187
1.1 - 3.0	3.1	248
3.1 - 9.0	4.9	413
9.1 -20.0	1.2	96
20.1+	0	0
Total	12.2	957

OTHER MEASUREMENTS

Average residue depth		(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger		(percent)	85
Average duff and litter depth		(inches)	1.1
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent)	43
	Jeffrey pine	(percent)	39
	incense-cedar	(percent)	3
Rotted residue 3.1-inch diameter and larger		(percent)	15

HARVEST INFORMATION

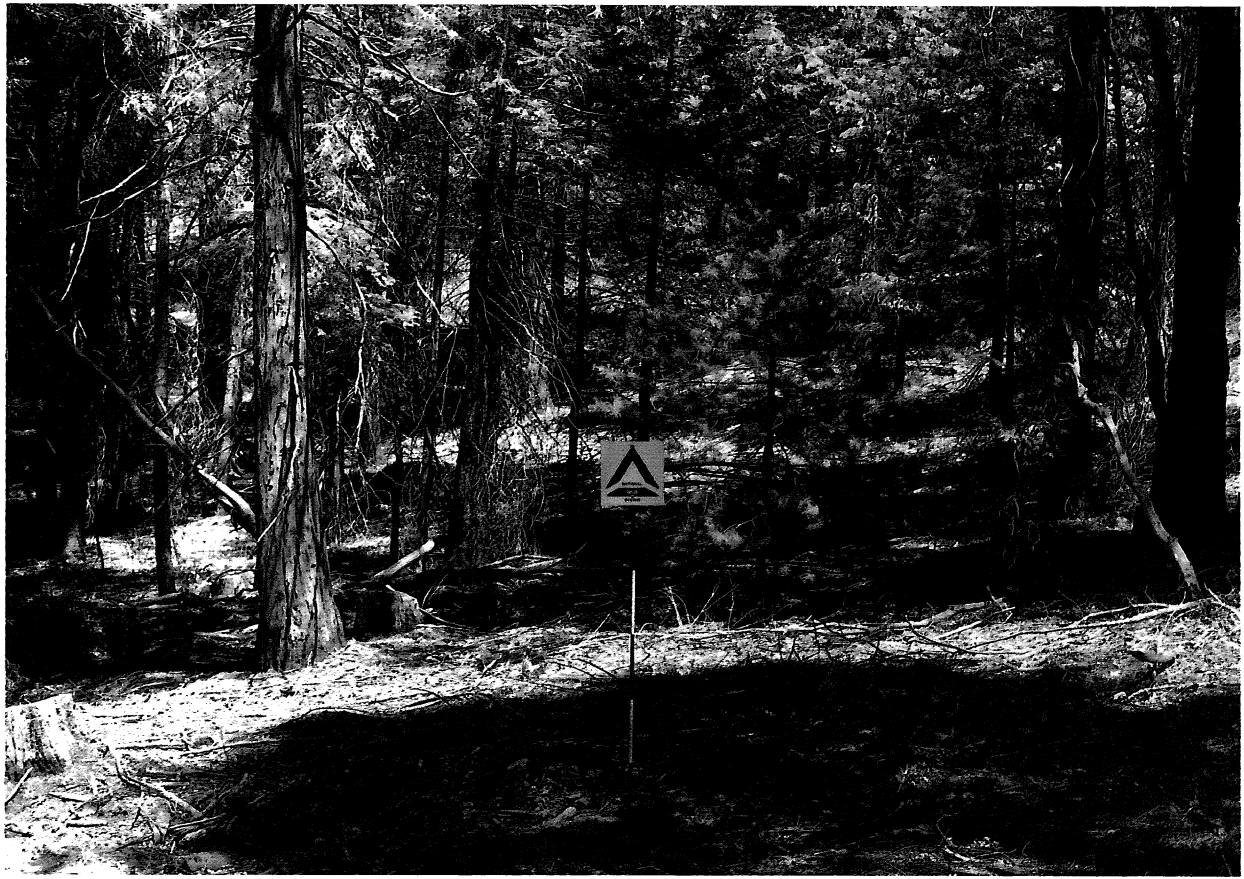
		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 6.5		x
Net volume	(M fbm/acre) 6.3		x
Average stems/acre cut	50		x
Average d.b.h. of stems cut	(inches) 15		x
Stand age	(years) 80		x
Cutting prescription	Tree selection		x
Yarding method	Tractor		x
Slash treatment	None		x
Period since cut or treatment	(months) 24	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	12
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	2.0

REMARKS

General marking rule on this sale was to cut all stems over 10-inch d.b.h.



3-MC-3-PC

DATA SHEET

Residue descriptive code 3-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.4	27
0.26- 1.0	2.6	174
1.1 - 3.0	5.1	409
3.1 - 9.0	6.9	417
9.1 -20.0	0	0
20.1+	0	0
Total	15.0	1,027

OTHER MEASUREMENTS

Average residue depth		(feet)	0.2
Ground area covered by residue 1/4-inch diameter and larger		(percent)	69
Average duff and litter depth		(inches)	.8
Sound residue 3.1-inch diameter and larger	black oak	(percent)	65
	incense-cedar	(percent)	25
	ponderosa pine	(percent)	10
Rotted residue 3.1-inch diameter and larger		(percent)	0

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE	
		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 6.7		x
Net volume	(M fbm/acre) 6.5	x	
Average stems/acre cut	19	x	
Average d.b.h. of stems cut	(inches) 20	x	
Stand age	(years) 90	x	
Cutting prescription	Tree selection	x	
Yarding method	Tractor	x	
Slash treatment	Lop & scatter;spot burn	x	
Period since cut or treatment	(months) 10	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	5
Flame length	(feet)	3
Resistance to suppression	(chains/man-hour)	2.4

REMARKS

4-MC-3-PC

DATA SHEET

Residue descriptive code 4-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.5	33
0.26- 1.0	4.4	294
1.1 - 3.0	4.0	321
3.1 - 9.0	6.1	498
9.1 -20.0	1.4	120
20.1+	0	0
Total	16.4	1,266

OTHER MEASUREMENTS

Average residue depth		(feet) 0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent) 91
Average duff and litter depth		(inches) 1.2
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent) 67
	Douglas-fir	(percent) 12
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent) 21

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE	
		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 12.5	x	
Net volume	(M fbm/acre) 12.5	x	
Average stems/acre cut	28	x	
Average d.b.h. of stems cut	(inches) 19	x	
Stand age	(years) 60	x	
Cutting prescription	Tree selection	x	
Yarding method	Tractor	x	
Slash treatment	Lop & scatter	x	
Period since cut or treatment	(months) 12	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour) 7
Flame length	(feet) 4
Resistance to suppression	(chains/man-hour) 2.0

REMARKS

5-MC-3-PC

DATA SHEET

Residue descriptive code 5-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.3	20
0.26- 1.0	2.6	174
1.1 - 3.0	4.4	353
3.1 - 9.0	7.0	566
9.1 -20.0	5.6	449
20.1+	0	0
Total	19.9	1,562

OTHER MEASUREMENTS

Average residue depth		(feet)	0.6
Ground area covered by residue 1/4-inch diameter and larger		(percent)	87
Average duff and litter depth		(inches)	1.1
Sound residue 3.1-inch diameter and larger	Jeffrey pine	(percent)	89
	white fir	(percent)	7
	incense-cedar	(percent)	4
Rotted residue 3.1-inch diameter and larger		(percent)	0

HARVEST INFORMATION

			HARVEST INFORMATION SOURCE	
			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	8.6		x
Net volume	(M fbm/acre)	8.4		x
Average stems/acre cut		60		x
Average d.b.h. of stems cut	(inches)	15		x
Stand age	(years)	80		x
Cutting prescription	Tree selection			x
Yarding method	Tractor			x
Slash treatment	None			x
Period since cut or treatment	(months)	30	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	13
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	1.7

REMARKS

General marking rule on this sale was to cut all stems over 10-inch d.b.h.

6-MC-3-PC

DATA SHEET

Residue descriptive code 6-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.1	7
0.26- 1.0	2.3	154
1.1 - 3.0	3.0	240
3.1 - 9.0	10.9	978
9.1 -20.0	2.0	192
20.1+	2.1	224
Total	20.4	1,795

OTHER MEASUREMENTS

Average residue depth	(feet)	0.6
Ground area covered by residue 1/4-inch diameter and larger	(percent)	100
Average duff and litter depth	(inches)	3.4
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	45
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	55

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) *		
Net volume	(M fbm/acre) *		
Average stems/acre cut	100		x
Average d.b.h. of stems cut	(inches) 6		x
Stand age	(years) 90		x
Cutting prescription	Understory removal[1/]		x
Yarding method			x
Slash treatment	Broadcast burn		x
Period since cut or treatment	(months) 60		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	5
Flame length	(feet)	3
Resistance to suppression	(chains/man-hour)	1.3

REMARKS

Understory removed by precommercial thinning.

7-MC-3-PC

DATA SHEET

Residue descriptive code 7-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.8	53
0.26- 1.0	7.2	481
1.1 - 3.0	7.5	601
3.1 - 9.0	6.9	491
9.1 -20.0	3.2	342
20.1+	0	0
Total	25.6	1,968

OTHER MEASUREMENTS

Average residue depth		(feet)	0.6
Ground area covered by residue 1/4-inch diameter and larger		(percent)	83
Average duff and litter depth		(inches)	.8
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent)	36
	black oak	(percent)	17
		(percent)	
Rotted residue 3.1-inch diameter and larger		(percent)	47

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) 12.5	x	
Net volume	(M fbm/acre) 12.5	x	
Average stems/acre cut	28	x	
Average d.b.h. of stems cut	(inches) 19	x	
Stand age	(years) 60	x	
Cutting prescription	Tree selection	x	
Yarding method	Tractor	x	
Slash treatment	None	x	
Period since cut or treatment	(months) 12	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	9
Flame length	(feet)	6
Resistance to suppression	(chains/man-hour)	0.9

REMARKS

DATA SHEET

Residue descriptive code 8-MC-3-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	1.8	120
1.1 - 3.0	3.7	296
3.1 - 9.0	13.3	1,127
9.1 -20.0	20.7	1,761
20.1+	13.6	1,202
Total	53.3	4,519

OTHER MEASUREMENTS

Average residue depth		(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent)	57
Average duff and litter depth		(inches)	.4
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent)	58
	incense-cedar	(percent)	16
	white fir	(percent)	5
Rotted residue 3.1-inch diameter and larger		(percent)	21

HARVEST INFORMATION

			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	7.5		x
Net volume	(M fbm/acre)	6.5	x	
Average stems/acre cut		19	x	
Average d.b.h. of stems cut	(inches)	20	x	
Stand age	(years)	90	x	
Cutting prescription	Tree selection		x	
Yarding method	Tractor		x	
Slash treatment	Broadcast burn		x	
Period since cut or treatment	(months)	2	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	0
Flame length	(feet)	0
Resistance to suppression	(chains/man-hour)	1.5

REMARKS

TRUE FIR

SIZE CLASS 4

REGENERATION CUT

A SERIES OF 6 LEVELS

REMINDERS TO USERS:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.

2. Stumps are not included in residue quantities.

3. Rotted residue is that which would come apart or splinter when kicked.

1-TF-4-RC

DATA SHEET Residue descriptive code 1-TF-4-RC

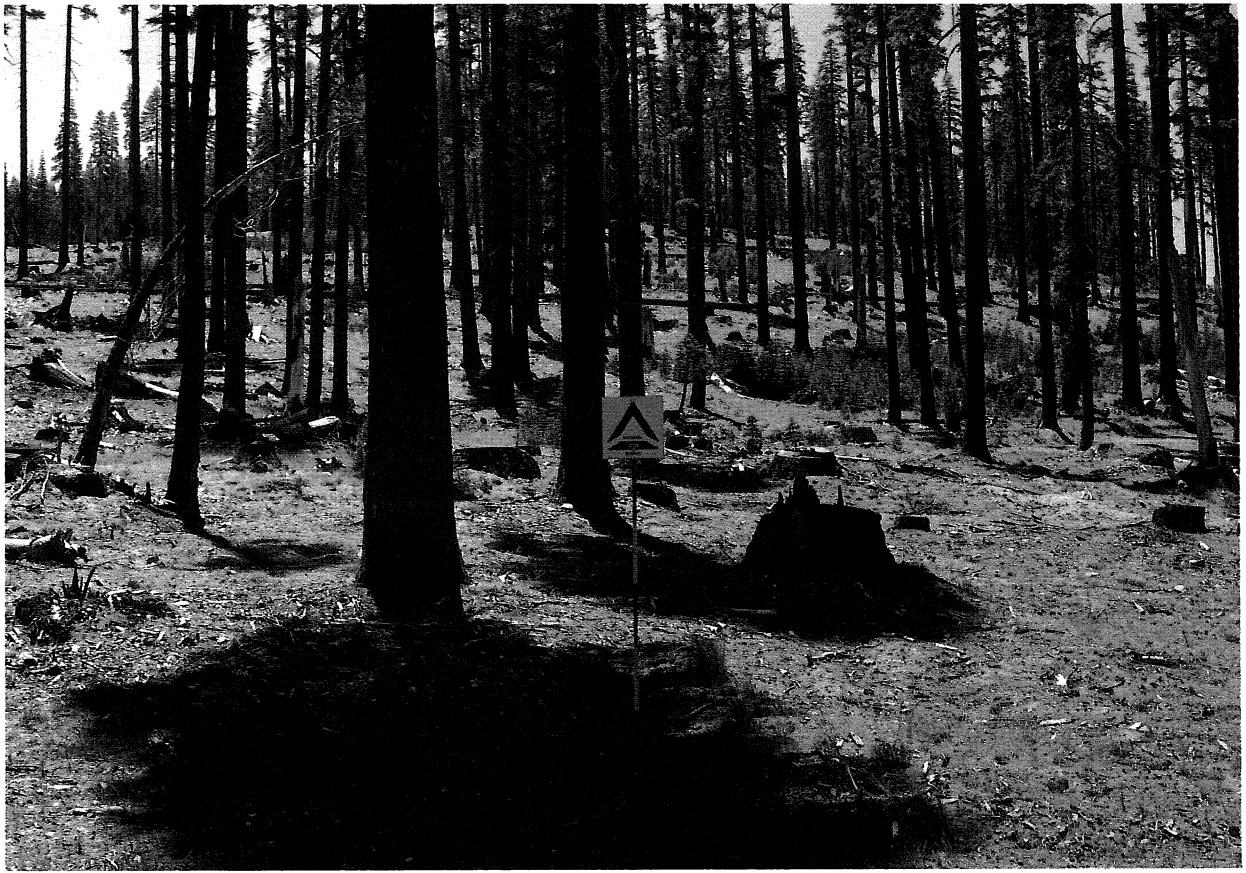
LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	1.1	73
1.1 - 3.0	2.9	232
3.1 - 9.0	.4	34
9.1 -20.0	0	0
20.1+	0	0
Total	4.6	352

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.1
Ground area covered by residue 1/4-inch diameter and larger	(percent)	68
Average duff and litter depth	(inches)	.2
Sound residue 3.1-inch diameter and larger red fir	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION		HARVEST INFORMATION SOURCE	
		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 30		x
Net volume	(M fbm/acre) 28		x
Average stems/acre cut	32		x
Average d.b.h. of stems cut	(inches) 25	x	
Stand age	(years) 150	x	
Cutting prescription	Shelterwood	x	
Yarding method	Tractor	x	
Slash treatment	Broadcast burn	x	
Period since cut or treatment	(months) 24	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY		
Spread rate	(chains/hour)	0
Flame length	(feet)	0
Resistance to suppression	(chains/man-hour)	12

REMARKS



2-TF-4-RC

DATA SHEET

Residue descriptive code 2-TF-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.3	20
0.26- 1.0	1.4	93
1.1 - 3.0	3.8	304
3.1 - 9.0	1.4	121
9.1 -20.0	0	0
20.1+	0	0
Total	6.9	538

OTHER MEASUREMENTS

Average residue depth	(feet)	0.1
Ground area covered by residue 1/4-inch diameter and larger	(percent)	93
Average duff and litter depth	(inches)	.6
Sound residue 3.1-inch diameter and larger grand fir	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION

		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 14		x
Net volume	(M fbm/acre) 13		x
Average stems/acre cut	15		x
Average d.b.h. of stems cut	(inches) 25	x	
Stand age	(years) 150	x	
Cutting prescription	Shelterwood	x	
Yarding method	Tractor	x	
Slash treatment	Machine pile & burn	x	
Period since cut or treatment	(months) 24	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	0
Flame length	(feet)	0
Resistance to suppression	(chains/man-hour)	6.0

REMARKS

Complete history of this site not known, but it appeared that at least two entries had been made prior to the shelterwood cut.

3-TF-4-RC

DATA SHEET

Residue descriptive code 3-TF-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.3	20
0.26- 1.0	3.6	240
1.1 - 3.0	12.1	970
3.1 - 9.0	6.4	560
9.1 -20.0	4.1	357
20.1+	0	0
Total	26.5	2,147

OTHER MEASUREMENTS

Average residue depth	(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger	(percent)	100
Average duff and litter depth	(inches)	.7
Sound residue 3.1-inch diameter and larger red fir	(percent)	84
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	16

HARVEST INFORMATION

			HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre)	40		x
Net volume	(M fbm/acre)	38		x
Average stems/acre cut		36		x
Average d.b.h. of stems cut	(inches)	25	x	
Stand age	(years)	150	x	
Cutting prescription	Shelterwood		x	
Yarding method	Tractor		x	
Slash treatment	YUM[1/] & machine treat[2/]		x	
Period since cut or treatment	(months)		x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	2
Flame length	(feet)	3
Resistance to suppression	(chains/man-hour)	1.3

REMARKS

Treated with Trackmac machine.

[1/] Required yarding unmerchantable material (YUM) down to 10-inch diameter, small end, and 10-foot length.

4-TF-4-RC

DATA SHEET

Residue descriptive code 4-TF-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.9	60
0.26- 1.0	5.3	354
1.1 - 3.0	4.6	369
3.1 - 9.0	15.8	1,338
9.1 -20.0	2.1	195
20.1+	0	0
Total	28.7	2,316

OTHER MEASUREMENTS

Average residue depth	(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger	(percent)	88
Average duff and litter depth	(inches)	.4
Sound residue 3.1-inch diameter and larger white fir	(percent)	83
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	17

HARVEST INFORMATION

		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 36		x
Net volume	(M fbm/acre) 33		x
Average stems/acre cut	34	x	
Average d.b.h. of stems cut	(inches) 26	x	
Stand age	(years) 200		x
Cutting prescription	Tree selection	x	
Yarding method	Tractor	x	
Slash treatment	Burned concentrations		x
Period since cut or treatment	(months) 18		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	5
Flame length	(feet)	4
Resistance to suppression	(chains/man-hour)	1.1

REMARKS

5-TF-4-RC

DATA SHEET

Residue descriptive code 5-TF-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.2	13
0.26- 1.0	2.0	134
1.1 - 3.0	4.8	385
3.1 - 9.0	11.0	945
9.1 -20.0	10.4	911
20.1+	3.1	261
Total	31.5	2,649

OTHER MEASUREMENTS

Average residue depth	(feet)	0.2
Ground area covered by residue 1/4-inch diameter and larger	(percent)	95
Average duff and litter depth	(inches)	.7
Sound residue 3.1-inch diameter and larger red fir	(percent)	86
western white pine	(percent)	2
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	12

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	HARVEST INFORMATION SOURCE: Onsite estimation
Gross volume	(M fbm/acre) 12		x
Net volume	(M fbm/acre) 11		x
Average stems/acre cut	10		x
Average d.b.h. of stems cut	(inches) 25	x	
Stand age	(years) 200		x
Cutting prescription	Shelterwood	x	
Yarding method	Tractor	x	
Slash treatment	Lop to 25-inch height	x	
Period since cut or treatment	(months) 24	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	5
Flame length	(feet)	3
Resistance to suppression	(chains/man-hour)	2.0

REMARKS

Entry prior to this cut had left much large, untreated residue.

6-TF-4-RC

DATA SHEET

Residue descriptive code 6-TF-4-RC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	1.6	107
0.26- 1.0	6.3	421
1.1 - 3.0	6.2	497
3.1 - 9.0	16.2	1,372
9.1 -20.0	28.1	2,499
20.1+	25.6	2,604
Total	84.0	7,500

OTHER MEASUREMENTS

Average residue depth	(feet)	0.7
Ground area covered by residue 1/4-inch diameter and larger	(percent)	92
Average duff and litter depth	(inches)	.2
Sound residue 3.1-inch diameter and larger white fir	(percent)	48
incense-cedar	(percent)	4
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	48

HARVEST INFORMATION

		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 40		x
Net volume	(M fbm/acre) 35		x
Average stems/acre cut	43	x	
Average d.b.h. of stems cut	(inches) 24	x	
Stand age	(years) 150		x
Cutting prescription	Clearcut	x	
Yarding method	Tractor	x	
Slash treatment	None	x	
Period since cut or treatment	(months) 15	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	8
Flame length	(feet)	5
Resistance to suppression	(chains/man-hour)	0.7

REMARKS

TRUE FIR

SIZE CLASS 4

PARTIAL CUT

A SERIES OF 5 LEVELS

REMINDERS TO USERS:

1. The marker in these photos is 1 foot square, and theppole is painted in contrasting colors at 1-foot intervals to provide perspective.

2. Stumps are not included in residue quantities.

3. Rotted residue is that which would come apart or splinter when kicked.

1-TF-4-PC

DATA SHEET

Residue descriptive code 1-TF-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.5	33
0.26- 1.0	2.2	147
1.1 - 3.0	6.3	505
3.1 - 9.0	7.3	627
9.1 -20.0	1.3	110
20.1+	0	0
Total	17.6	1,422

OTHER MEASUREMENTS

Average residue depth	(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger	(percent)	95
Average duff and litter depth	(inches)	.5
Sound residue 3.1-inch diameter and larger red fir	(percent)	93
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	7

HARVEST INFORMATION

			HARVEST INFORMATION SOURCE	
			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	30		x
Net volume	(M fbm/acre)	29		x
Average stems/acre cut		32		x
Average d.b.h. of stems cut	(inches)	25	x	
Stand age	(years)	150		x
Cutting prescription	Group selection			x
Yarding method	Tractor		x	
Slash treatment	Lop to 25-inch height		x	
Period since cut or treatment	(months)	24	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	3
Flame length	(feet)	2
Resistance to suppression	(chains/man-hour)	3.0

REMARKS

2-TF-4-PC

DATA SHEET

Residue descriptive code 2-TF-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.3	20
0.26- 1.0	2.1	140
1.1 - 3.0	3.5	280
3.1 - 9.0	8.9	765
9.1 -20.0	3.9	403
20.1+	6.0	481
Total	24.7	2,089

OTHER MEASUREMENTS

Average residue depth		(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent)	97
Average duff and litter depth		(inches)	2.0
Sound residue 3.1-inch diameter and larger	white fir	(percent)	27
	ponderosa pine	(percent)	33
	other	(percent)	12
Rotted residue 3.1-inch diameter and larger		(percent)	28

HARVEST INFORMATION

			HARVEST INFORMATION SOURCE	
			Sale records	Onsite estimation
Gross volume	(M fbm/acre)	4.5		x
Net volume	(M fbm/acre)	4.0		x
Average stems/acre cut		2	x	
Average d.b.h. of stems cut	(inches)	44	x	
Stand age	(years)	250	x	
Cutting prescription	Tree selection		x	
Yarding method	Tractor		x	
Slash treatment	YUM[1/]			x
Period since cut or treatment	(months)	14	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	5
Flame length	(feet)	3
Resistance to suppression	(chains/man-hour)	1.7

REMARKS

[1/] Required yarding unmerchantable material (YUM) down to 8-inch diameter, small end, and 10-foot length.

3-TF-4-PC

DATA SHEET

Residue descriptive code 3-TF-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	1.2	80
0.26- 1.0	4.1	274
1.1 - 3.0	6.6	529
3.1 - 9.0	10.6	909
9.1 -20.0	12.7	1,113
20.1+	3.8	321
Total	39.0	3,226

OTHER MEASUREMENTS

Average residue depth	(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger	(percent)	100
Average duff and litter depth	(inches)	1.8
Sound residue 3.1-inch diameter and larger red fir	(percent)	57
white fir	(percent)	26
ponderosa pine	(percent)	2
Rotted residue 3.1-inch diameter and larger	(percent)	15

HARVEST INFORMATION

		HARVEST INFORMATION SOURCE: Sale records	Onsite estimation
Gross volume	(M fbm/acre) 22		x
Net volume	(M fbm/acre) 18		x
Average stems/acre cut	11	x	
Average d.b.h. of stems cut	(inches) 30	x	
Stand age	(years) 250	x	
Cutting prescription	Group selection	x	
Yarding method	Tractor	x	
Slash treatment	Lop & scatter	x	
Period since cut or treatment	(months) 48	x	

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour)	7
Flame length	(feet)	4
Resistance to suppression	(chains/man-hour)	1.5

REMARKS

4-TF-4-PC

DATA SHEET

Residue descriptive code 4-TF-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	1.3	87
0.26- 1.0	5.8	387
1.1 - 3.0	7.8	625
3.1 - 9.0	19.1	1,586
9.1 -20.0	8.6	710
20.1+	6.4	526
Total	49.0	3,921

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.6
Ground area covered by residue 1/4-inch diameter and larger		(percent)	99
Average duff and litter depth		(inches)	3.3
Sound residue 3.1-inch diameter and larger	white fir	(percent)	93
	incense-cedar	(percent)	3
	sugar pine	(percent)	2
Rotted residue 3.1-inch diameter and larger		(percent)	2

HARVEST INFORMATION		HARVEST INFORMATION SOURCE	
		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 8.0		x
Net volume	(M fbm/acre) 7.5		x
Average stems/acre cut	30		x
Average d.b.h. of stems cut	(inches) 18		x
Stand age	(years) 120		x
Cutting prescription	Tree selection		x
Yarding method	Tractor		x
Slash treatment	None		x
Period since cut or treatment	(months) 30		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY		
Spread rate	(chains/hour)	8
Flame length	(feet)	5
Resistance to suppression	(chains/man-hour)	0.7

REMARKS

5-TF-4-PC

DATA SHEET Residue descriptive code 5-TF-4-PC

LOADING

Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.0 - 0.25	0.5	33
0.26- 1.0	4.7	314
1.1 - 3.0	6.2	497
3.1 - 9.0	20.0	1,769
9.1 -20.0	45.0	3,767
20.1+	29.9	2,817
Total	106.3	9,197

OTHER MEASUREMENTS

Average residue depth		(feet) 0.6
Ground area covered by residue 1/4-inch diameter and larger		(percent) 92
Average duff and litter depth		(inches) 5.0
Sound residue 3.1-inch diameter and larger	white fir	(percent) 71
		(percent)
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent) 29

HARVEST INFORMATION

		Sale records	Onsite estimation
Gross volume	(M fbm/acre) 1/		
Net volume	(M fbm/acre) 1/		
Average stems/acre cut	40		x
Average d.b.h. of stems cut	(inches) 20		x
Stand age	(years) 300		x
Cutting prescription	Sanitation cut		x
Yarding method	None		x
Slash treatment	None		x
Period since cut or treatment	(months) 96		x

ASSESSMENT OF FIRE BEHAVIOR AND SUPPRESSION DIFFICULTY

Spread rate	(chains/hour) 7
Flame length	(feet) 5
Resistance to suppression	(chains/man-hour) 0.5

REMARKS

No volume removed from cutting; trees were felled to remove diseased trees from stand.

1/

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